

## Abstract

The present invention provides an ethylene polymerization catalyst. The present invention also provides a process for preparing the ethylene polymerization catalyst, comprising reacting powdered magnesium with an alkyl halide of formula  $RX$  in the presence of an ether solvent to form a magnesium compound having a structure represented by the formula  $(RMgX)_p(MgX_2)_q$ , in which  $R$  is an alkyl group having from 3 to 12 carbon atoms,  $X$  is halogen, and molar ratio of  $q$  to  $p$  is in the range of from larger than 0 to 1, impregnating the magnesium compound onto silica carrier, reacting the silica loading the magnesium compound with an alkyl halide of formula  $R^1X$ , a titanium compound and an alkyl aluminum compound to form a main catalyst component, contacting the main catalyst component with a cocatalyst component to form catalyst for ethylene polymerization. The present invention also relates to the use of the catalyst in the polymerization of ethylene.